KHEYFETS, M.Ye.

PHASE I BOOK EXPLOITATION 497

Akademiya nauk SSSR. Komitet po geodezii i geofizike

Mezhdunarodnaya assotsiatsiya geodezii; tezisy dokladov na XI General'noy assambleye Mezhdunarodnogo geodezicheskogo i geofizicheskogo soyuza (The International Association of Geodesy; Abstracts of the Reports at the XI General Assembly of the International Union of Geodesy and Geophysics) Moscow, Izd-vo AN SSSR, 1957. 63 p. 1,500 copies printed.

PURPOSE: The purpose of this booklet is the dissemination of abstracts of the reports presented by the Soviet members of the International Association of Geodesy at the XI General Assembly of the International Union of Geodesy and Geophysics.

COVERAGE: This booklet, with full English translation of the Russian text, published by The National Committee for Geodesy and

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Geophysics of the Academy of Sciences of the USSR presents abstracts of reports by the Soviet members of the International Association of Geodesy at the XI General Assembly of the International Union of Geodesy and Geophysics. No personalities are mentioned. There are no references.

TABLE OF CONTENTS:

KHeyfets, M.Ye. Quartz-metal Pendulum 5

The quartz-metal pendulum is well suited for precision work and in gravity observations at sea. It is stable, comparatively unsensitive to temperature changes and to magnetic fields and does not require an elaborate support system. Its shape, size and weight, do not differ from the Sturckrat pendulum. It consists of a fused quartz stem, invar head and a lenticularly-shaped brass bob. Each pendulum is subjected to rigorous tests for strength and temperature hysteresis; static and dynamic temperature coefficients and barometric coefficients after a lapse of years remain practically constant. The use of such a pendulum at first order stations, even under very adverse climatic conditions and transportation difficulties, is well justified.

Izotov, A.A. The Reference Ellipsoid and the Basic Geodetic Data Used in USSR 9

The reduction of triangulation to sea level and the subsequent development of it on the surface of the geoid introduce considerable distortions into the main geodetic framework. The method of projecting triangulation directly on the surface of the reference ellipsoid developed and adapted in USSR is free from such drawbacks. Krasovskiy's ellipsoid derived from measurements in USSR, W. Europe and USA offers a close enough figure of the Earth, applicable to the continents of the Northern hemisphere only.

Larin, B. A. Thermal Properties of Invar Measuring Wires 12

Modern triangulation techniques require the highest degree of accuracy in measuring base lines. In the USSR, the commonly accepted 24 m. long invar or super-invar wires show little change in thermal coefficients with time, or thermal after-effects on the length of the wire. Invar wires can now be manufactured with temperature coefficients of equal value but of opposite sign.

Entin, I.I. Basis Systematic Errors in Precision Leveling 16

The systematic errors in precision leveling are vertical displacements of the markers and of the tripod, and changes in the angle between the line of sight and the bubble axis due to the effect of temperatures. Other errors caused by non-vertical position of the rods, etc. are noted, and means for correcting them are recommended. In precision leveling the computed systematic error is ± 0.05 mm per kilometer.

Sinyagina, M. I. Preliminary Findings in the Study of Vertical Displacement of the Earth's Crust Through Repeat Leveling

There is a considerable number of repeat leveling traverses in the European part of the USSR, run to obtain a vertical control grid of the entire USSR. The western part of European USSR, circumscribed by the Baltic, Black and Azov seas, is more thoroughly covered by observations and as such was selected for the study of uplifts. The necessary material was selected, systematized and properly computed. To this study of 20,000 km of traverses, were added other geodetic data including oceanographic and geo-morphological material; 82% of all the traverses proved to be reliable. The recent rate of uplift is -5 to +10 mm per annum, determined to an accuracy of 2 mm per annum

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Pellinen, L. P. The Effect of Refraction on Angular Measurements

The main source of systematic errors in triangulation work is laterial (horizontal) refraction. In observation during one night or day, the errors vary between ± 0.5 - 0.7. Under unfavorable conditions there may appear other errors of the same order. The greatest of these is caused by refraction while measuring traverses in cities, when the line of sight passes close to and parallel to the wall of a large building. The accepted technique of triangulation in USSR and the adopted methods of adjustments minimize the effects of refraction.

Belyayev, N.A. A Photoelectric Device for Field Astronomical Measurements 26

The described photoelectric system designed to record the passage time of stars is attached to the AU 2/10 astronomical vertical instrument (engineer's transit) and does not increase substantially the weight or bulk of a field party's equipment; it is easy to control and permits making longitudinal and latitudinal determinations at first order stations without introducing human errors into the observations. . Accuracy achieved is greater than usual and observations can be reduced in number.

Molodenskiy, M. S. New Methods in Studying the Earth's Figure 28

In relation to the Earth's gravitational field the figure of a geoid is not of single definition. To make it so, densities all over outside the geoid must be determined. The author worked out another way of investigating the Earth's figure, which excludes the necessity of knowing the density of masses outside the geoid.

Molodenskiy, M. S. Solution of the Stokes Problem With a Relative Error on the Order of the Square of the Earth's Oblateness 33

By applying Stokes' formula to an ellipsoid surface such accurate results are obtained, that the relative error is reduced to the order of the square of the oblateness.

Lyustikh, Ye. N. Abyssal Structure of the Earth's Crust in Indonesia Based on Gravity Data 34

Describing the geotectonics of Indonesia, and the seismicity and volcanism of the area, the author discusses the origin of the region, its structural setting and the existing geo-synclines and uplifts. He connects the belts of active and extinct volcanoes with two lines of the Inner Sunda and the Northern part of the Inner Celebes uplifts. The focal depths of earthquakes are greater than 50 km. Distribution of gravity anomalies and their quantitative interpretation does not fit into the Vening Meinesz picture, nor do the hypotheses of buckling, contraction, convection or horizontal displacements account for the real distribution of gravity anomalies.

Kruchinenko, V.G., Platonov, Yu.P., Sukhov, V. B.
Electromechanical Device for Computing the Mean Moments of the Passage of Stars During Observations 39

A photoelectric amplifier makes it possible to measure the duration of two parts of a contact (rectangular output signal) into which it is divided by a pulse from a clock. Computing the moment of a star's passage is accomplished by a formula given in the text. Observations could also be conducted of high magnitude stars producing deformed edges of the contacts. Means of increasing the efficiency of the device were also indicated.

Nemiro, A.A. and Pavlov, N.N. Systematic $\Delta\alpha_{\alpha}$ errors of the FK3 Type and Their Influence on the Determination of Time 49

The comparison of fundamental and new absolute catalogues with FK3 permits finding in the latter considerable systematic errors of the type $\Delta\alpha_{\alpha}$. Tables give comparative values for FK3 with Nikolayev (N30), GC and Pulkovo (Pu$\alpha$1) with respect to $\Delta\alpha_{\alpha}$. The observed errors have a tangible effect on the correction of time. It is pointed out that Washington determinations of time corrections are distinguished by their high accuracy.

Pavlov, N.N. Recent Results of Photoelectric Observations of the Pulkovo Time Service 54

Recent (1955-56) observations of the right ascension of stars made with a new 100 mm Zeiss transit instrument show much greater accuracy than those made with previous photoelectrical instruments. The probable observation error for one star, reduced to the equator, and the probable error of hourly corrections for ten stars was much smaller than in the past. It is proposed to organize at Pulkovo, during the IGY, observations by two transit instruments covering more than 500 stars.

Fedorov, Ye. P. Computing the Coordinates of the Pole 60

The systematic errors in the coordinates of the Pole published by the Central Bureau of the International Latitude Service (ILS) are caused by an insufficient number (3-6) of observations. The regular latitude observations are now conducted at 13 stations and will be increased probably to more than 20 during the IGY. With a sufficiently large number of stations participating in this program, the inherently weak loop method of calculations is still the most acceptable as some difference in the systems of declinations at various stations will not significantly affect the results. Mean latitudes are determined by A. Orlov's method.

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8-21-58

SHOKIN, Panteleymon Fedorovich; BULANZHE, Yu.D., retsenzent; LOZINSKAYA, A.M., retsenzent; VESELOV, K.Ye., retsenzent; KHEYFETS, M.Ye., retsenzent; MAKAROV, N.P., retsenzent; MAKAROV, N.P., retsenzent; ALEKSANDROV, S.Ye., red.; VASIL'YEVA, V.I., red.izd-va; ROMANOVA, V.V., tekhn.red.

[Gravimetry; apparatus and methods for gravity measurements] Gravimetriia; pribory i metody izmereniia sily tiazhesti. Moskva, Izd-vo geodez.lit-ry, 1960. (MIRA 13:5)
(Gravity)

KHEYFETS, M. YE.

S/006/60/000/008/001/001
B012/B051

AUTHOR: ~~None given~~

TITLE: Chronicle

PERIODICAL: Geodeziya i kartografiya, 1960, No. 8, pp. 72-77

TEXT: From May 10-14, 1960 the shestoye Mezhduvedomstvennoye soveshchaniye po gravimetrii (Sixth Interdepartmental Conference on Gravimetry) was held in Moscow. It was convened by the geodezicheskaya sektsiya Komiteta geodezii i geofiziki Akademii nauk SSSR (Section for Geodesy of the Committee of Geodesy and Geophysics of the Academy of Sciences USSR) and the Aerogravimetricheskaya laboratoriya Instituta fiziki Zemli AN SSSR (Laboratory for Aerogravimetry of the Institute of Physics of the Earth of the AS USSR). 216 representatives of 64 organizations took part in this conference: production organizations, research centers, testing and construction organizations, educational institutions, and organizations of the Akademiya nauk SSSR (Academy of Sciences USSR), Sibirskoye otdeleniye AN SSSR (Siberian Department of the

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Chronicle

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AS USSR), Akademii nauk Ukrainskoy, Gruzinskoy, Litovskoy i Azerbaydzhanskoy SSR (Academies of Sciences of the Ukrainskaya, Gruzinskaya, Litovskaya, and Azerbaydzhanskaya SSR), Ministerstvo vysshego i srednego spetsial'nogo obrazovaniya SSSR (Ministry of Higher and Secondary Special Education of the USSR), Ministerstvo geologii i okhrany nedr SSSR (Ministry of Geology and Preservation of Mineral Resources), Komitet standartov, mer i izmeritel'nykh priborov pri Sovete Ministrov SSSR (Committee on Standards, Measures, and Measuring Instruments of the Council of Ministers USSR), NII VTS, Gosudarstvennyy Komitet Soveta Ministrov SSSR po avtomatizatsii i mashinostroyeniyu (State Committee on Automation and Machine Construction of the Council of Ministers USSR), as well as representatives of the factories of the Moskovskiy sovnarkhoz (Moscow Sovnarkhoz) and the Leningradskiy sovnarkhoz (Leningrad Sovnarkhoz) that produce gravimetric apparatus. 70 lectures were held. I. D. Zhongolovich (Institut teoreticheskoy astronomii AN SSSR (Institute of Theoretical Astronomy of the AS USSR) spoke about the "Experience With Determining Some Parameters of the Gravitational Field of the Earth From Observations of the Second and

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Third Artificial Satellites". B. M. Yanovskiy (VNIIM) spoke about "The Determination of the Absolute Value of Gravitational Acceleration of the Point of VNIIM in Leningrad". M. Ye. Kheyfets spoke about the "High-precision Pendulum Apparatus of the TsNIIGAiK", V. A. Tulin about "Portable Quartz Clocks", L. A. Gerenburg about "Questions of Time Recording in Pendulum Measurements", G. M. Mininzon, T. M. Ayrapetyan, and M. S. Davydov about the "Portable Gravimeter-altimeter ГВП-1 (GVP-1)", K. Ye. Veselov about the "Design of a High-precision Gravimeter", Yu. D. Bulanzhe (IFZ AN SSSR (IFZ AS USSR)) about "The Main Working Directions in the Field of Determining Gravitational Acceleration on the Sea", V. A. Romanyuk about "The Theory of Determining Gravitational Acceleration on the Sea by Means of Gravimeters", A. M. Lozinskiy about "String Sea Gravimeters". M. S. Molodenskiy (TsNIIGAiK) investigated in his lecture tolerable errors already published in reports or submitted for publication by some authors. Among these are papers by I. F. Monin (L'vovskiy politekhnicheskiy institut (L'vov Polytechnic Institute)), A. K. Malovichko (Permskiy Gosudarstvennyy universitet (Perm' State University)), and S. V. Gromov (Leningradskiy Gosudarstvennyy universitet

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(Leningrad State University)). L. A. Govorova spoke about "The Errors of Interpolation of Gravity Anomalies and the Accuracy of Determining Gravimetric Deflections of the Vertical", B. A. Bryusov (MGU) about "Errors of the Representation and Interpolation of Gravitational Anomalies". S. N. Shcheglov reported on "Preliminary Results of Geodetic and Gravimetric Work in the Antarctica", Yu. N. Avsyuk on the "Structure of the Earth Crust in the Antarctica According to Seismo-gravitational Data", S. A. Ushakov on "The Structure of the Earth Crust in the Antarctica According to Gravimetric Data". P. S. Zakatov (MIIGAiK) spoke about the "Preparation and Use of Gravimetric Experts". The recommendations given by the Conference are mentioned. From April 19 to 22, 1960 a Scientific and Technical Conference of the Workers of the Topographic-geodetic and the Surveying Service of the Glavnoye Upravleniye geologii i okhrany nedr pri Sovete Ministrov Ukrainskoy SSR (Main Administration of Geology and Preservation of Mineral Resources of the Council of Ministers Ukrainskaya SSR) was held in Artemovsk. There, the state of the topographic-geodetic and surveying work in the organizations of the Glavgeologiya USSR (Glavgeologiya UkrSSR) and the introduction of new

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techniques and technology in production were discussed. At the Conference it was stated that the extent of the work mentioned will be considerably increased within the next seven years. Furthermore, the following drawbacks were pointed out: The methods applied are too extensive and expensive, the geological organizations are insufficiently equipped with new apparatus; in geological observations the aerophotographs and topographic plans available on a large scale are not sufficiently used. This state is explained by inefficient technical direction, inefficient technical and material supply, by a lack of suitable direction in the Glavgeologiya UkrSSR and the Ministerstvo geologii i okhrany nedr SSSR (Ministry of Geology and Preservation of Mineral Resources of the USSR). Recommendations are given to improve this situation. For improving the qualifications of the workers the Conference suggested to convene scientific and technical conferences at regular intervals. For improving information and for the exchange of experience the editorial board of the present periodical was asked to furnish a section for topographic and geodetic work in geological observations. The participants in the Conference appealed to the workers

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of the topomarksheyderskaya sluzhba Glavgeologii USSR (Topographic and Surveying Service of the Glavgeologiya UkrSSR) to do everything possible in order to carry out the resolutions of the 21st Party Congress of the CPSU and the Plenum of the Central Committee of the CPSU in June. ✓

Card 6/6

SLIVIN, Yu.A.; KHEYFETS, M. Ye.

Method for precise determination of pendulum oscillation periods. Trudy TSNIIGAIK no.139:89-101 '60. (MIRA 14:7)
(Pendulum)

KHEYFETS, M.Ye.

Apparatus of the Central Scientific Research Institute of Geodesy, Aerial Photography, and Cartography for measuring inclinations and accelerations of a pendulum instrument in gravity measurements at sea. Trudy TSNIIGAIK no.139:103-120 '60. (MIRA 14:7)

(Pendulum)

GERENBURG, L.A.; SLIVIN, Yu.A.; KHEYFETS, M.Ye.

Expeditionary quartz chronometer manufactured at the Gravimetric Laboratory of the Central Scientific Research Institute of Geodesy, Aerial Photography, and Cartography. Trudy TSNIIGAIK no.139:121-134 '60. (MIRA 14:7)
(Chronometer)

KHEYFETS, M.E., inzh.; ALBEGOV, I.K., inzh.

Standard stock single-column hoisting devices for inspecting electric transformers. Elek. sta. 31 no.9:38-41 S '60. (MIRA 14:10)
(Cranes, derricks, etc.) (Electric transformers)

ACCESSION NR: AR4036342 S/0169/64/000/003/G025/G025

SOURCE: Referativny*y zhurnal. Geofizika, Abs. 3G163

AUTHOR: Kheyfets, M. Ye.; Malakhov, B. M.; Berezin, E. M.

TITLE: Experience in gravity measurement on shipboard

CITED SOURCE: Sb. ref. Tsentr. n.-i. in-t reqd., aeros"emki i kartogr., vy*p. 32, 1962, 24-29

TOPIC TAGS: gravimetry, gravimeter, pendulum measurement, gravimetric survey, geophysical instrument

TRANSLATION: An experimentol apparatus has been designed for gravimetric observations with a pendulum instrument on shipboard. The apparatus is equipped with a device for centering, arresting and locking the pendulums while being transported in their supports. The apparatus was adapted to a N-55 gyrostabilized platform and experimental measurements were made on shipboard. The pendulums make it possible to make measurements when there are waves at sea up to class 4-5. Pendulum periods are determined with sufficient accuracy from the photogram.

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ACCESSION NR: AR4036342

In 1960 a model of the shipboard pendulum instrument was constructed; it includes a four-pendulum support, a gyroframe and a horizon photorecorder (see Sb. ref. Tsentr. n.-i. in-t geod., aeros"yemki i kartogr., 1962, no. 32, 21-23). A film 19 cm wide is used for recording four real and two fictitious pendulums and also the vertical accelerometer. The records of the horizon photorecorder are used for control of instrument stabilization and determination of the accuracy of operation of the gyrostabilized platform. Synchronization of all the records is accomplished using a quartz clock. Tests of the model of the shipboard pendulum instrument were made aboard a vessel with a displacement of 6,000 tons. Ninety stations were determined,/of which 26, insofar as possible, coincided with stations where pendulum observations were made aboard a submarine. For 26 control stations the Brown corrections for horizontal accelerations averaged -81 mgal and for vertical accelerations +125 and ±134 mgal respectively. Corrections for vertical accelerations at all control points improve the results of surface measurements and the differences in anomalies agree with submarine measurements with a mean square error of ±11 mgal with an absence of systematic

Card 2/3

ACCESSION NR: AR4036342

discrepancies (-1.3 ± 2.2 mgal). Introduction of a correction for horizontal accelerations leads to large systematic errors. P. Shokin.

DATE ACQ: 17Apr64 SUB CODE: AS ENCL: 00

Card 3/3

ACCESSION NR: AR4036343 S/0169/64/000/003/G025/G025

SOURCE: Referativny*y zhurnal. Geofizika, Abs. 3G164

AUTHOR: Malakhov, B. M.; Kheyfets, M. Ye.

TITLE: The possibility of making pendulum measurements of gravity aboard an aircraft

CITED SOURCE: Sb. ref. Tsentr. n.-i. in-t redo., aeros"emki i kartogr., vy*p. 32, 1962, 30-33

TOPIC TAGS: gravity, gravity measurement, geophysics, gravimetry, gravimetric survey

TRANSLATION: The gravimetric laboratory of the Tsentral'ny*y nauchnoissledovatel'skiy institut geodezii, aerofotos"yemki i kartografii (Central Scientific Research Institute of Geodesy, Aerial Photography and Cartography) in November 1961 made an attempt to use the ship-borne pendulum instrument (Sb. ref. Tsentr. n.-i. in-t geod., aerofotos"yemki i kartogr., 1962, no. 32, 24-29) aboard an aircraft for determining the stability of operation of the pendulums and also

ACCESSION NR: AR4036343

for estimating the influence of vibrations and accelerations with the objective of developing experimental work for use of the pendulum instrument in an aerogravimetric survey. An IL-12 aircraft was used for making 5 flights of altitudes of 900, 1,200 and 1,500 m during which the altitude variations were ± 10-30 m. Horizontal accelerations attained 15 gals and vertical accelerations up to 50 gals. Flight duration along a linear flight line was 15-25 minutes. The instrument operated normally on all flights. With respect to the influence of accelerations the conditions for flight observations unexpectedly were better than in measurements made aboard surface vessels. Plans call for manufacture of a special model of a pendulum instrument and continuation of experimental aircraft measurements. P. Shokin.

DATE ACQ: 17Apr64 SUB CODE: AS ENCL: 00

Card 2/2

S/0286/64/000/009/0079/0079

ACCESSION NR: AP4036838

AUTHOR: Kheyfets, M. Ye.; Slivin, Yu. A.

TITLE: A method for determining the amplitude of pendulum oscillations and a device for carrying out this method. Class 42, No. 162329

SOURCE: Byul. izobr. i tovar. znakov, no. 9, 1964, 79

TOPIC TAGS: pendulum, oscillation, pendulum oscillation, oscillation amplitude, pendulum oscillation amplitude, amplitude determination, oscillation amplitude determination, pendulum oscillation amplitude determination

ABSTRACT: 1. This author's certificate introduces a method for determination of the amplitude of pendulum oscillations with the use of a photocell which fixes the moments of passage of the pendulum in various elongation angles, the linear or angular differences of which are known. The commands for closing the relay which moves the shutter which opens the slots corresponding to the known elongation angles are transmitted when the pendulum passes through the equilibrium position.

2. A device for carrying out the described method. In order to make it possible to measure the amplitude photoelectrically with the photoelectric determination of the

KHEYFETS, M.Ye.

Some problems in the theory of the oscillation of pendulums on a mobile horizontal platform. Trudy TSNIIGAIK no.159: 5-28 '64. (MIRA 17:12)

AUTHOR: Silvin, Yu. A.; Kheyfets, M. Ye.

Pendulum for gravimetric measurements. Class 42, No. 172067

SOURCE: Byulleten' izobreteniy i tovarnykh [illegible]

[illegible] metric measurement, measuring instrument, pendulum

[illegible] author's certificate introduces [illegible]

[illegible]

[illegible] aeros'yemki

B: Nickel

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut geodezii, aeros"yemki [illegible] fii (All-Union Scientific Research Institute of Geodesy, Aerial Photo- [illegible] Cartography)

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[illegible]

[illegible], M. Yu.; [illegible]

AUTHORS: Kheyfets, M. Ye.; Malakhov, B. M.; Slivin, Yu. A.; Sinyagovskiy, B. P.; Yefimov, B. V. 44

53
B

A method for measuring the force of gravity at sea. Class 42 No. 172068

44

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 12, 1965, 83

TOPIC TAGS: gravitation, gravitation field, gravity acceleration, gravimeter

This Author Certificate presents a method for measuring the force of [illegible] a gravimetric [illegible] apparatus [illegible] moves in [illegible] accelerations [illegible] of measurements taken [illegible] in rough seas, the gravimeter [illegible] fluctuating horizontal gravity [illegible] direc-

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[illegible] its first derivative. The [illegible] apparatus and [illegible] support

L 3541-66 EWT(1) GW UR/0286/65/000/015/0089/0090

ACCESSION NR: AP5024410

AUTHORS: Kheyfets, M. Ye.; 44,55 Terekhov, V. P.; 44,55 Slivin, Yu. A.; 44,55 Zdobnikov, Ye. T.; 44,55 Ivanova, A. A.; 44,55 Beresin, E. M. 44,55

TITLE: Device for measuring the gravitational force. Class 42, No. 173435 32 B

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 15, 1965, 89-90

TOPIC TAGS: gravimeter, submarine 10 12,44,55

ABSTRACT: This Author Certificate presents a device for measuring the gravitational force from submarines and drifting ice. The device contains three quartz-metal pendulums mounted on the base plate of a thermostated support placed in an arrested Cardan suspension, arresting and locking devices for the pendulums, thermometers, a hygrometer, a triggering lever for each pendulum, a device for applying time marks to the photorecord of the pendulum oscillations, a control panel, and perturbing acceleration detectors. To increase the accuracy of the measurements and to simplify their processing, additional mirrors are mounted on the support plate so that the images of the transmitting diaphragms reflected from the outer pendulums are produced in the focal plane of the objective (see Fig. 1 on the Enclosure). To insure the uniform setting of the pendulums on the

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ACCESSION NR: AP5024410

axis of the arresting device, a template is installed which imparts a forward motion to a stop spring. The spring is kinematically coupled to the template and presses the end part of the pendulum knife edge onto a fixed support rigidly coupled to the support plate. For remote control of the pendulums, electric drives are mounted on the support, which are controlled from the panel and are kinematically coupled to the arresting and locking devices and the stop spring. To control the initial amplitudes and phases of the oscillation of the middle pendulum, an additional triggering lever with a driving frame is installed. To maintain the position of the center of gravity of the device when rewinding the film, a compensator is installed. The compensator is in the form of a weight moving with film feed along a screw which is kinematically coupled to the axle of the film spool. To simplify the arresting of the Cardan suspension, the arrestor in the form of a screw with a control wheel clamps the outer ring of the Cardan suspension through a plate of the inner ring to the support on the stand. To record the readings of a mercury thermometer on the common photorecord, an anamorphic adaptor is mounted on the support. Orig. art. has: 1 diagram.

ASSOCIATION: none

SUBMITTED: 19Feb63 ENCL: 01 SUB CODE: ES

NO REF SOV: 000 OTHER: 000

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ACCESSION NR: AP5024410

ENCLOSURE: 01

O

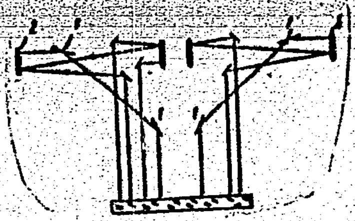

Fig. 1. 1- additional mirrors;
2- outer pendulums

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L 25443-66 EWT(1) GW

ACC NR: AP6009623 SOURCE CODE: UR/3010/65/000/016/0067/0081

29
B

AUTHOR: Kheyfets, M. Ye.

ORG: none

TITLE: High-precision pendulum 17 measurements of gravity 12 in the Soviet Union

SOURCE: AN SSSR. Mezhduvedomstvennyy geofizicheskiy komitet. Geofizicheskiy byulleten', no. 16, 1965, 67-81

TOPIC TAGS: geophysic instrument, measuring instrument, gravimeter, gravimetry, pendulum

ABSTRACT: The author briefly reviews the development of gravimetry and concludes that the pendulum method possess significant accuracy potentials which may be realized provided the development of instruments takes advantage of the achievements of modern instrument building and radioelectronic industries. The errors, due mostly to the instability of pendulums, the determination of their temperature, and the effect of the Earth's magnetic field, were considerably reduced with the use of the quartz-metal pendulums, developed in the Gravimetric Laboratory of the Central Scientific-Research Institute of Geodesy Aerial Photography, and Cartography (gravimetricheskaya laboratoriya Tsentral'nogo nauchno-issledovatel'skogo instituta geodezii, aerofotos"yemki i kartografii). The accuracy of the new instruments was improved so that their measurements could be compared with those of gravimeters.

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Practically, the accuracy of both types of instruments was identical. The various expeditions engaged in field work and using both types of instruments are described. The different methods used in the determination of the accuracy of the measurements are discussed and compared. The most important comparison is that of the data of pendulum measurements in 1960—63 with the measurements of the Institute of Physics of the Earth im. O. Yu. Shmidt, AN SSSR (Institut fiziki Zemli AN SSSR), made by means of GAE gravimeters during the same period. All the necessary data are presented in Table 1. It is noted that in recent years some foreign countries observe systematic errors which are inherent in pendulum as well as in gravimetric instruments. The author notes that corresponding deviations of the pendulum and the gravimetric results, as well as pendulum measurements performed by various types of instruments in some countries (e.g., G. P. Wollard, J. C. Rose. International gravity measurements. — Madison Wisconsin Geophysic and Polar Res. Center Univ. Wisconsin, 1963) are, for some reason, higher than those in the Soviet Union. This, apparently, is due to shortcomings in foreign instruments. The author considers it interesting and important to have a comparison made of Soviet and foreign results on pendulum measurements, provided both are evaluated by an identical method. Some of the shortcomings in Soviet work are noted. It is concluded that it is conclusively established that the pendulum method of measurement should be developed with the same intensity as the gravimetric method. The potentials of the pendulum method are extremely great and in conjunction with other methods will contribute substantially to science and technology. Orig. art. has: 6 tables, 4 figures, and 1 formula.

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### Table 1. A Comparison of Pendulum and Gravimetric Measurements in 1969—63.

| POINT | INCREMENT IN GRAVITY, MGAL: BY PENDULUMS | INCREMENT IN GRAVITY, MGAL: BY GRAVIMETERS | DIFFERENCES |
|---|---|---|---|
| RYBNOYE | + 989,32+0,12 | + 989,90±0,19 | —0,58 |
| GRIBNOY | + 369,52±0,20 | + 369,66±0,13 | —0,14 |
| SOLNECHNOYE | + 337,87±0,03 | ± 338,05±0,13 | —1,18 |
| ZELENOYE | + 99,70±0,23 | + 99,70±0,16 | 0,00 |
| KAMENSK | — 978,46±0,07 | — 978,83±0,18 | +0,37 |
| OBSERVATORSKAYA | —1403,05±0,10 | —1405,08±0,19 | +1,43 |
| MEAN SQUARE | ±0,14 | ±0,17 | |

SUB CODE: 08 / SUBM DATE: none / ORIG REF: 023 / OTH REF: 004

Card 3/3 lc

KHEĬFETS, M. Z., ED.

Issledovaniia v oblasti regulirovaniia parovykh turbin; sbornik statei. Leningrad, Gosenergoizdat, 1950. 251 p. diagrs.

At head of title: IU. V. Vorob'ev (i dr.)

Includes bibliographies.

Research in the field of steam turbine contro; collected articles.

DLC: TJ735.K48

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

SOV/112-59-5-8554

8(6)

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1959, Nr 5, pp 22-23 (USSR)

AUTHOR: Ovrutskaya, N. B., and Kheyfets, M. Z.

TITLE: Axial Stability of the Turbo-Machine Rotor Having an Unloading Device

PERIODICAL: Tr. Leningr. metallich. z-da, 1957, Nr 5, pp 345-350

ABSTRACT: Full or partial turbo-machine-rotor unloading (with the thrust bearing present) is considered for positive, negative or no feedback cases. In deriving the stability equation, an allowance has been made for the piston discharge as well as for the effect of piston pressure on the discharge. In partial-unloading systems, the stability conditions hold true with no negative feedback. With a positive or negative feedback, the stability conditions require that the volume of the unloading chamber be restricted. For full-unloading systems, the absence of negative feedback or a positive feedback makes the system unstable or makes it approaching the stability limit. The full-unloading system can be

Card 1/2

stable only with a negative feedback and a limited volume of the unloading chamber. An example of calculating the full-unloading system stability is presented, as well as graphs of the system oscillations.

I.N.G.

LEBEDEV, Aleksandr Aleksandrovich, doktor tekhn. nauk, prof.;
CHERNOBROVKIN, Lev Semenovich; TKACHENKO, Ya.Ye., retsenzent;
TOMASHEVICH, D.L., doktor tekhn. nauk, retsenzent; KHEYFETS,
N.A., doktor tekhn. nauk, retsenzent; GORTSUYEVA, N.A., red.
izd-va; ROZHIN, V.P., tekhn. red.

[Dynamics of the flight of pilotless aircraft]Dinamika poleta
bespilotnykh letatel'nykh apparatov. Pod red. A.A.Lebedeva.
Moskva, Oborongiz, 1962. 548 p. (MIRA 15:12)
(Aerodynamics) (Guided missiles)

FINN, G.R., dots., otv. red.; DUBOVSKIY, V.G., dots., red.; SUTIN, I.A., prof., red.; KHEYFETS, N.S., dots., red.

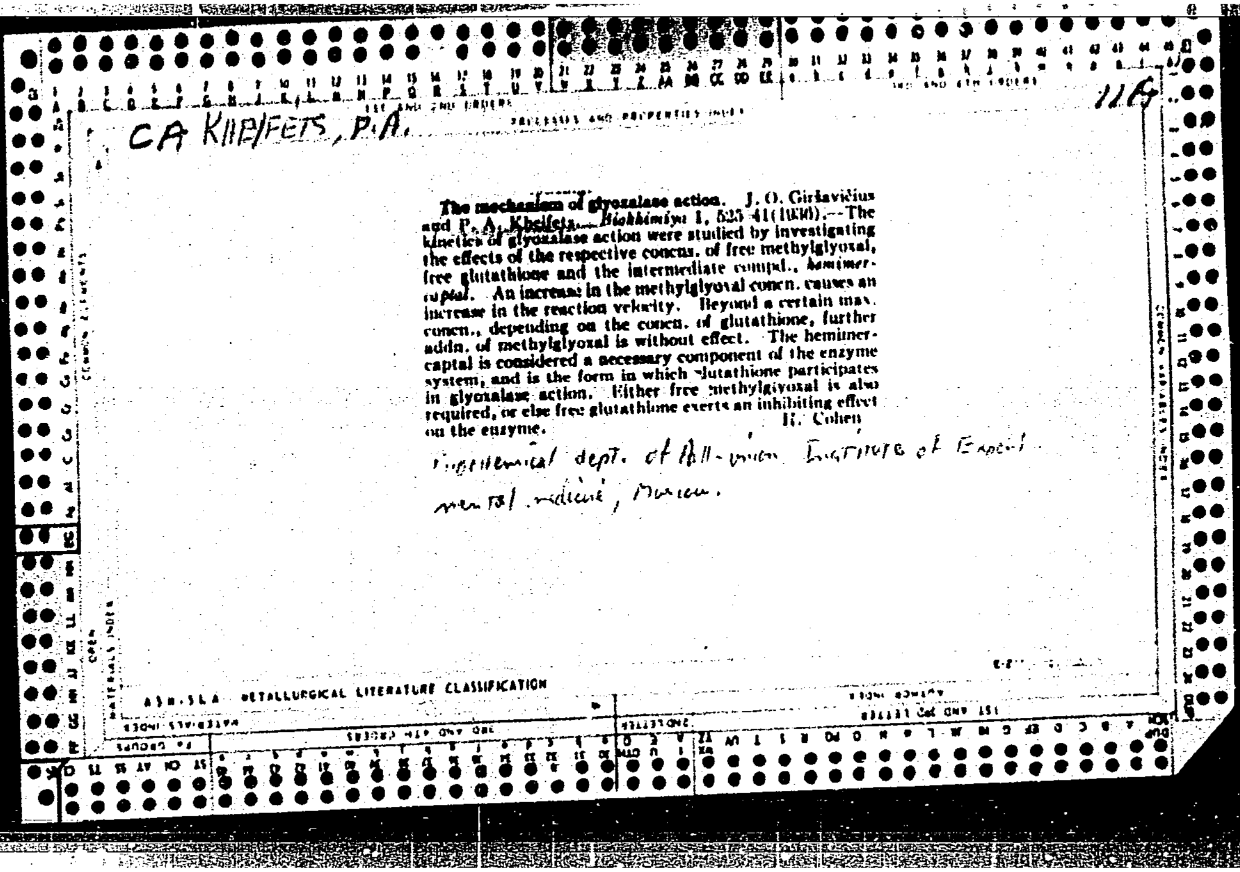
[Materials of the Scientific Conference on Intestinal Infections] Materialy Nauchnoi konferentsii po kishechnym infektsiiam. Volgograd, Gos. med. in-t, 1962. 33 p. (MIRA 18:4)

1. Nauchnaya konferentsiya po kishechnym infektsiyam.
2. Zaveduyushchiy kafedroy mikrobiologii Volgogradskogo gosudarstvennogo meditsinskogo instituta (for Finn).
3. Zaveduyushchiy kafedroy infektsionnykh bolezney Volgogradskogo gosudarstvennogo meditsinskogo instituta (for Dubovskiy).

GUDKOV, V.M., kand.tekhn.nauk; KHEYFETS, O.S., gornyy inzh.

Reliability of quality graphs plotted on the basis of sampling development openings. Nauch. trudy MGI no.18:167-181 '57. (MIRA 11:9)

(Ores--Sampling and estimation)

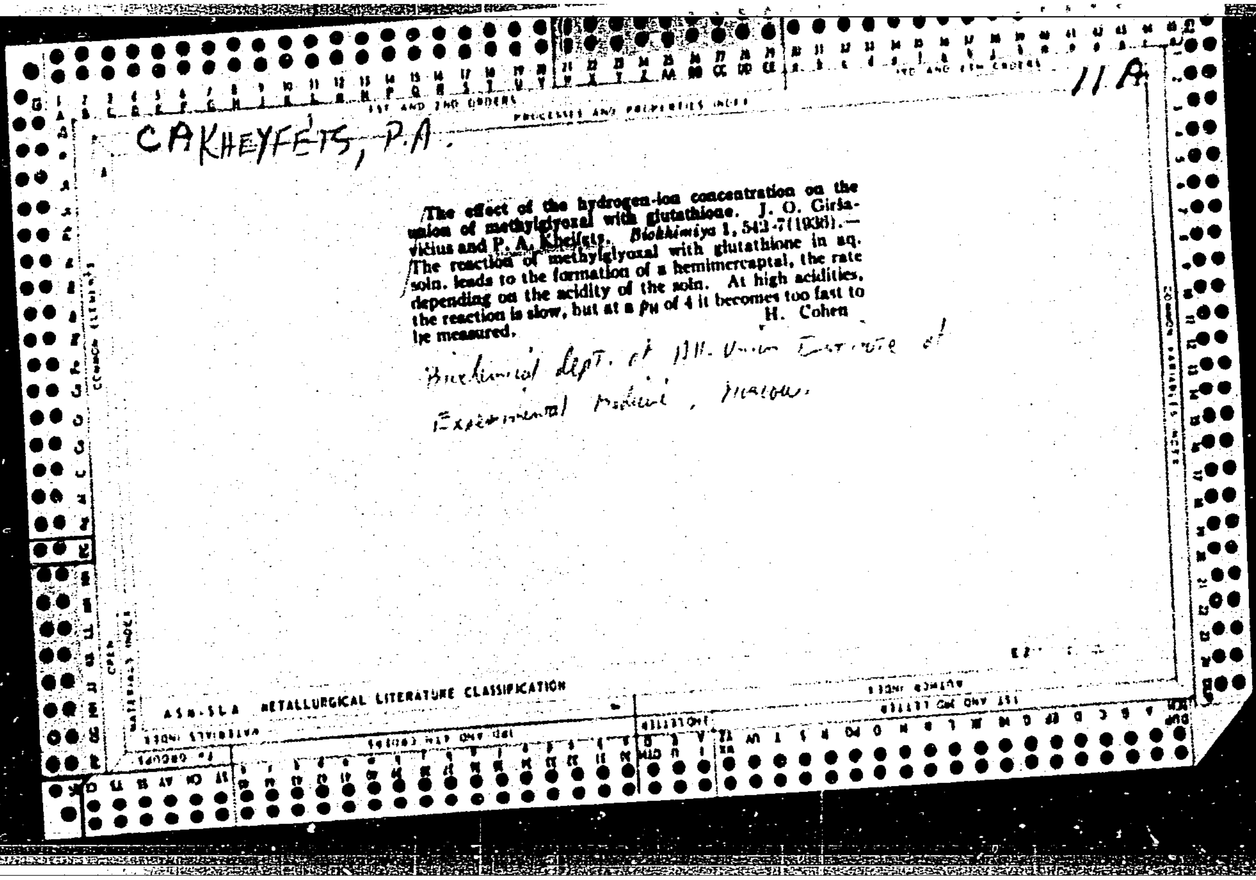

1ST AND 2ND ORDERS
PROCESSES AND PROPERTIES INDEX
3RD AND 4TH ORDERS
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION
MATERIALS INDEX

CA KHEIFETS, P.A.

11A

**The mechanism of glyoxalase action.** J. O. Giršavičius and P. A. Kheifets. *Biokhimiya* 1, 525-41(1936).—The kinetics of glyoxalase action were studied by investigating the effects of the respective concns. of free methylglyoxal, free glutathione and the intermediate compd., *hemimercaptal*. An increase in the methylglyoxal concn. causes an increase in the reaction velocity. Beyond a certain max. concn., depending on the concn. of glutathione, further addn. of methylglyoxal is without effect. The hemimercaptal is considered a necessary component of the enzyme system, and is the form in which glutathione participates in glyoxalase action. Either free methylglyoxal is also required, or else free glutathione exerts an inhibiting effect on the enzyme. R. Cohen

Biochemical dept. of All-union Institute of Experimental medicine, Moscow.


1ST AND 2ND ORDERS
PROCESSES AND PROPERTIES INDEX
3RD AND 4TH ORDERS
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

CAKHEYFETS, P.A.

11A

**The effect of the hydrogen-ion concentration on the union of methylglyoxal with glutathione.** J. O. Giršavicius and P. A. Kheifets. *Biokhimiya* 1, 543-7(1936).—The reaction of methylglyoxal with glutathione in aq. soln. leads to the formation of a hemimercaptal, the rate depending on the acidity of the soln. At high acidities, the reaction is slow, but at a pH of 4 it becomes too fast to be measured. H. Cohen

Biochemical Dept. of All-Union Institute of Experimental Medicine, Moscow.

KHEYFETS, P. A.

"Distribution of Amino-Nitrogen Between the Erythrocytes and Plasma of Blood in the Course of Experimental Brown-Pierce Cancer in Rabbits."
Thesis for degree of Cand, Medical Sci.
Sub 30 Oct 50, First Moscow Order of Lenin Med Inst

Summary 71, 4 Sep 52, Dissertations Presented for Degrees in Science and Engineering in Moscow in 1950. From Vechernyaya Moskva, Jan-Dec 1950.

KHEYFETS P.B.

7A

23

PROCESSES AND PROPERTIES INDEX

**The influence of pitch in wood cellulose on its viscosity.** L. A. Kantor and P. B. Kheifetz. *Bumazh. Prom.* 22, No. 4, 32-4(1947).—Exptl. results are presented to show that cuprammonium viscosity of bleached and unbleached wood cellulose is dependent not only on the degree of depolymerization and the no. of cellulose bonds but, to a great degree, on the presence of pitch in the cellulose, a pitch content greater than 1% increasing the indicated viscosity several-fold with no change in mech. strength.

Marshall Sittig

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

KHEYFETS, S.

**KHEIFETS, S.**

[Financing industrial cooperatives] Finansy promyslovoi kooperatsii. Moskva, Gosfinizdat, 1955. 141 p. (MLRA 8:12)
(Cooperative societies)

KHEYFETS, S.

FILIPPOV, Ivan Ivanovich; SOKOLOV, Aleksey Grigor'yevich; KHEYFETS, S., otvetstvennyy redaktor; PROSHIHA, L., redaktor izdatel'stva; DZHATIYEV, S., tekhnicheskiy redaktor

[Financing city and district enterprises] Finansirovanie gorodskogo i raionnogo khoziaistva. Moskva, Gosfinizdat, 1957. 173 p. (MIRA 10:9)
(Finance)

KHEYFETS, S.

Distribution and use of accumulations by local industry. Fin. SSSR 19 no. 7:27-31 Jl '58. (MIRA 11:8)
(Profit)

ROTSHTEYN, L.; KHEYFETS, S.

Problems of distributing and utilizing profit in industry. Fin.
SSSR 21 no.11:44-51 N '60. (MIRA 13:11)
(Profit) (Russia--Industries)

KAZANKOVA, K.; KHEYFETS, S.

Business accounting and planning unit costs of industrial products.
Fin. SSSR 22 no.3:66-73 Mr '61. (MIRA 14:7)
(Cost, Industrial)

KHEYFETS, S.

Profit distribution and use in enterprises of local industry. Fin. SSSR 22 no.5:73-76 My '61. (MIRA 14:5)
(Profit)

ROZE, M.; KHEYFETS, S.

Speedier development and lowering of prices in the service industries. Vop.ekon. no.7:148-154 Jl '62. (MIRA 15:7)
(Service industries)

KHEYFETS, S.

More fully utilize the possibilities of local industry. Fin.SSSR
23 no.5:30-36 My '62. (MIRA 15:5)
(Industrial management) (Finance)

KHEYFETS, S.; ISKRUK, A.; KIRZHNER, A., inzh.; APROD, A., kand.sel'skokhoz.-nauk

Use of the AZhT-2 device for drying corn on the cob. Muk.-elev. prom. 28 no.5:21 My '62. (MIRA 15:5)

1. Direktor Krasnodarskogo mel'nichnogo kombinata (for Kheyfets).
2. Glavnyy inzh. Krasnodarskogo mel'nichnogo kombinata (for Iskruk).
3. Krasnodarskaya laboratoriya Vsesoyuznogo nauchno-issledovatel'skogo instituta zerna i produktov ego pererabotki (for Kirzhner, Aprod).

(Corn (Maize)--Drying)

KHEYFETS, S.

Procedures for using profit in the enterprises of local industry
and services to the population. Fin.SSSR 37 no.4:79-82 Ap '63.
(MIRA 16:4)

(Profit)

KHEYFETS, S., inzh.

Booms for the SKG-25 and SKF-30 cranes. Prom. stroi. i inzh. soor. 5 no.5:61 S-O '63. (MIRA 16:12)

KHEYFETS, S.A., inzhener.

Transportation by electric trucks in shipbuilding plants. Sudostroenie 22 no.4:40-41 Ap '56. (MLRA 9:9)
(Shipbuilding--Equipment and supplies)(Industrial electric trucks)

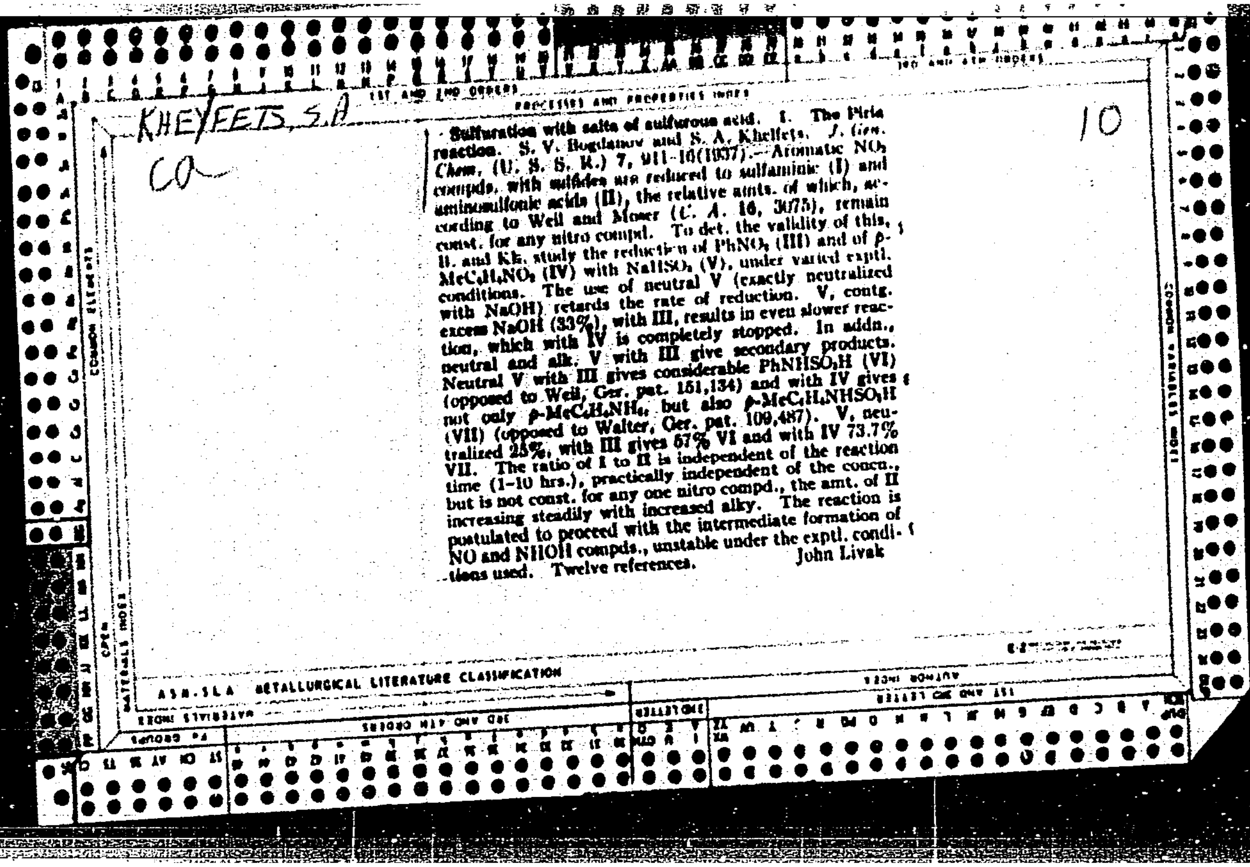
KHEYFETS, S.A., inzh.

[redacted] transport in industrial enterprises. Vest. mash. 37 no.8: 81-83 Ag '57. (MIRA 10:9)

(Materials handling)

KHEYFETS, S., inzh.

Gantry crane with a hoisting capacity of 50 t. and span of 38 m. Prom. stroi. i inzh. soor. 5 no.2:52-53 Mr-Ap '63. (MIRA 16:4)
(Cranes, derricks, etc.)



1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

KHEYFETS, S.A

CA

10

**Sulfuration with salts of sulfurous acid. I. The Piria reaction.** S. V. Bogdanov and S. A. Kheifets. *J. Gen. Chem.* (U. S. S. R.) 7, 911-16(1937).—Aromatic $NO_2$ compds. with sulfides are reduced to sulfaminic (I) and aminosulfonic acids (II), the relative amts. of which, according to Weil and Moser (*C. A.* 16, 3075), remain const. for any nitro compd. To det. the validity of this, B. and Kh. study the reduction of $PhNO_2$ (III) and of *p*-$MeC_6H_4NO_2$ (IV) with $NaHSO_3$ (V), under varied exptl. conditions. The use of neutral V (exactly neutralized with NaOH) retards the rate of reduction. V, contg. excess NaOH (33%), with III, results in even slower reaction, which with IV is completely stopped. In addn., neutral and alk. V with III give secondary products. Neutral V with III gives considerable $PhNHSO_3H$ (VI) (opposed to Weil, Ger. pat. 151,134) and with IV gives not only *p*-$MeC_6H_4NH_2$, but also *p*-$MeC_6H_4NHSO_3H$ (VII) (opposed to Walter, Ger. pat. 109,487). V, neutralized 25%, with III gives 67% VI and with IV 73.7% VII. The ratio of I to II is independent of the reaction time (1-10 hrs.), practically independent of the concn., but is not const. for any one nitro compd., the amt. of II increasing steadily with increased alky. The reaction is postulated to proceed with the intermediate formation of NO and NHOH compds., unstable under the exptl. conditions used. Twelve references. John Livak

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

KHEYFETS, S. A.

"Investigations in the Field of Cyanine Dyes: II. On Some Isomeric Dimethoxy-Thiacarbocyanines," Zhur. Obshch. Khim., 16, No.9, 1949.

Sci.Res.Inst. Cinema-Photography, Moscow

CA KHEYFETS, S.A.

**Cyanine dyes. IV. Some 6,6'-diacetamidothiacarbocyanines.** I. I. Levkoev, S. A. Kheifets, and N. S. Barvyn (All-Union Cinephoto Inst., Leningrad). *Zhur. Obshchei Khim.* (J. Gen. Chem.) 21, 1340-9(1951); cf. C.A. 41, 5951.—Acylation of amino groups of chain-unsubstituted 6,6'-diaminothiacarbocyanines shifts the abs. max. to shorter waves by 16-22 mμ. Most formylated and acetylated products have no less sensitizing ability than the unsubstituted dyes, but the acylamino derivs. do not possess sensitization of the 2nd order. Refluxing 8.2 g. 6-amino-2-methylbenzothiazole with 11.2 $HCO_2H$ 3 hrs. at 120-30° gave 90% yellow *6-formylamino-2-methylbenzothiazole formate*, m. 95-7°; *free base*, m. 111-12° (from $C_6H_6$); *MeI deriv.*, m. 252-3°; *EtBr deriv.*, m. 238-9°; *EtI deriv.*, m. 243-4°. Heating 18 g. 6-amino-2-methylbenzothiazole with 16.8 g. $Ac_2O$ in $C_6H_6$ gave 80% *6-acetamido analog*, m. 148-9°; *picrate*, yellow, m. 218-19°; *MeI deriv.*, m. 253-4°; *EtI deriv.*, m. 230-2°; *Et p-toluenesulfonate*, m. 197°; *Et perchlorate*, m. 262-3° (from $H_2O$). Similar treatment of the base with $MeSO_2Cl$ gave 86% *6-methylsulfonamido-2-methylbenzothiazole*, m. 145-6° (from EtOH); *EtI deriv.*, by heating the base with Et *p*-toluenesulfonate and treating the product with KI, m. 247-8° (from MeOH). Refluxing the 6-acetamido and 6-methylsulfonamido derivs. with a small excess of Et *p*-toluenesulfonate 6 hrs. to 125-45°, addn. of an ortho carbonate to the product followed by pyridine, and reheating to 130° gave after treatment with KBr the ppts. of the respective dyes listed below: *3,3'-diethyl-6,6'-di(acetamido)thiacarbocyanine bromide*, 70%, green, m. 271-2° (from EtOH); the *iodide*, deep green or blue, m. 268-9°; *p-toluenesulfonate*, m. 200-1° (from EtOH), green; *3,3'-diethyl-9-methyl-6,6'-di(acetamido)thiacarbocyanine bromide*, violet, 85%, m. 283° (from MeOH); *p-toluene sulfonate*, blue-violet, m. 261-2°; *iodide*, violet, m. 304-5°; *3,3',9-trimethyl-6,6'-di(acetamido)thiacarbocyanine bromide*, 47%, green, m. 290-1° (from EtOH); *iodide*, blue, m. 275°; *3,3'-diethyl-6,6'-di(methylsulfamido)thiacarbocyanine bromide*, 40%, violet, m. 300-1° (from EtOH); *3,3'-diethyl-9-methyl-6,6'-di(methylsulfamido)thiacarbocyanine bromide*, 84%, violet, m. 278-80° (from EtOH); and *3,3',9-triethyl-6,6'-di(methylsulfamido)thiacarbocyanine bromide*, 38%, violet, m. 280-2° (from MeOH). Refluxing 3,3'-diethyl-6,6'-di(acetamido)thiacarbocyanine *p*-toluenesulfonate with 25% HCl and treatment with KI gave *3,3'-diethyl-6,6'-diaminothiacarbocyanine iodide* (I), blue (contains EtOH of crystn.), m. 232°; the *9-Me homolog*, green, m. 217-9° (from EtOH); the *9-Et homolog*, green, m. 231-2° (contains EtOH of crystn.). Boiling I with $HCO_2H$ gives the *diformyl deriv.*, m. 205-7° (contains EtOH of crystn.); similarly the *diformyl deriv. of 9-Me homolog*, violet, m. 231-3° (contains MeOH of crystn.), and the *diformyl deriv. of 9-Et homolog*, blue-violet, m. 271-3° (contains MeOH). Refluxing 6-acetamido-2-methylbenzothiazole Et *p*-toluenesulfonate with the HCl salt of malonaldehyde dianil and EtONa in EtOH 30 min. gave *3,3'-diethyl-6,6'-di(acetamido)thiacarbocyanine p-toluenesulfonate*, green, m. 243°, abs. max. 670 mμ. Use of quinoline-EtI in above gave *3,1'-diethyl-6-acetamido-thia-4'-cyanine iodide*, red, m. 301° (from MeOH), abs. max. 512 mμ. Use of *p*-$Me_2NC_6H_4CHO$ in the above reaction using piperidine as the catalyst gave 77% *2-p-diethylaminostyryl-6-acetamidobenzothiazole ethyl p-toluenesulfonate*, red, m. 273-4°; the *EtI analog* obtained by addn. of KI to the above, blue-violet, m. 265°, abs. max. 532 mμ.

G. M. Kosolapoff

~~KH[illegible]TS~~, S. A.

CA KHEYFETS,

**Cyanine dyes. IV. Some 6,6'-diacetamidothiacarbocyanines.** I. I. Levkoev, S. A. Kheifets, and N. S. Barvyn. *J. Gen. Chem. U.S.S.R.* 21, 1463-71(1951)(Engl. translation).—See C.A. 45, 10107a. H. R.

Distr: 4E4j 7

√Tetra- and hexamethinehemicyanine dyes. [illegible] U.S.S.R.
-nikov, S. A. Kheifets, and N. S. Stoko[illegible]
107,123, Aug. 25, 1957. Dyes of the general structure [illegible]
Me, alkoxy, or alkylthio group; [illegible] and R''' together are a trimethylene group in which case R'' is H; R'''' is H or an alkyl; R''''' is an aryl or N(R'''')R''''' is a radical of tetrahydroquinoline; B and B' are aryls or B and B' together are a benzo or substituted benzo group; Y is S or Se; *n* is 0 or 1; and X is an acid radical, are obtained by heating a quaternary salt of a [illegible] deriv. of a [illegible]

[illegible]

over 100° with an equimol. quantity of an [illegible] formic acid ester or [illegible] secondary aromatic [illegible]

(4)

KHEYFETS, S.A.; SVESHNIKOV, N.N.

Studies in the field of cyanine dyes. Part 15: 5,5'- and 6,6'-diphenylthiacarbocyanines. Trudy NIKFI no.40:12-20 '60.(MIRA 15:2)
(Cyanines)(Dyes and dyeing)

KHEYFETS, S. A.; SVESHNIKOV, N. N.; DAMIR, N. A.

Synthesis of quaternary salts of 2-$\beta$-phenoxypropenylbenzothiazole and some of their reactions. Zhur. VKHO 7 no.5:582-583 '62. (MIRA 15:10)

1. Vsesoyuznyy nauchno-issledovatel'skiy kinofotoinstitut.

(Benzothiazole)

KHEYFETS, S.A.; YESIN, S.K.

Simple method for measuring the frequency of free transverse vibrations in a synchrotron. Atom. energ. 18 no.1:60 Ja '65.
(MIRA 18:2)

KHEYFETS, S.A.; OVESHNIKOV, N.N.

Synthesis and certain reactions of $\beta$-alkoxy-substituted polymethinehemicyanine dyes. Dokl. AN SSSR 163 no.5:1177-1180 Ag '65.
(MIRA 18:8)

1. Vsesoyuznyy nauchno-issledovatel'skiy kinofotoinstitut. Submitted September 14, 1964.

ALIKHANYAN, A.I.; KHEYFETS, S.A.; YESIN, S.K.

Electron and positron storing devices. Usp. fiz. nauk 81 no.1: 7-49 S '63. (MIRA 16:12)

GOL'DMAN, I.I.; KHEYFETS, S.A.

On the stopping of heavy particles. Izv.AN SSSR Ser.fiz.19 no.6: 665 N-D '55. (MIRA 9:4)

1.Fizicheskiy institut Akademii nauk Arm.SSR.
(Cosmic rays) (Nuclear physics)

9 (3), 24 (3)

AUTHORS: Orlov, Yu. F., Kheyfets, S. A. SOV/56-35-2-33/60

TITLE: The Depolarization of Electrons Because of the Radiation in a Magnetic Field (Depolyarizatsiya elektronov iz-za izlucheniya v magnitnom pole)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 2 (8), pp 513-514 (USSR)

ABSTRACT: The change of the polarization of electrons (with initial longitudinal polarization) during their rotation in a magnetic field may be used for the measurement of the anomalous magnetic moment of the electron. Therefore it would be interesting to calculate the depolarization caused by the radiation in a magnetic field. A wave function for the calculation of the emission probability with an inversion of the spin direction in a homogenous magnetic field H is explicitly given. Expressions are then given for the intensity of the transition $n, s = 0, A = 1, 0 \rightarrow n' = n - \nu, s' = 0, A' = 0,1$. The transitions with a change of the quantum number s make only an unimportant contribution to the total probability of the transition $n, A = 1, 0 \rightarrow n' = n - \nu, A' = 0,1$. The emission with an

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The Depolarization of Electrons Because of the Radiation in a Magnetic Field SOV/56-35-2-33/60

inversion of the spin direction has the order of magnitude $(\beta\nu/n)^2$ with respect to the total emission. Therefore, the depolarization of the electrons, which is caused by radiation, is of extraordinarily low intensity. There are 4 references, 2 of which are Soviet.

ASSOCIATION: Institut fiziki Akademii nauk Armyanskoy SSR (Physics Institute, AS Armyanskaya SSR)

SUBMITTED: April 10, 1958

Card 2/2

SOV/120-59-1-2/50

AUTHORS: Orlov, Yu. F., Tarasov, Ye. K., Kheyfets, S. A.

TITLE: The Damping of Particle Oscillations in an Electron Synchrotron with Strong Focussing (Dempfirovaniye kolebaniy chastits v elektronnom sinkhrotrone s zhestkoy fokusirovkoy)

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 1, pp 17-20 (USSR)

ABSTRACT: It was shown in Ref.1 that radiation may lead to an instability of radial oscillations in an electron accelerator with strong focussing. By varying the magnetic field in high gradient magnets, stability may be achieved for all degrees of freedom (Ref.2). In Refs.2 and 3 formulae were given for the damping coefficients. By varying the field along the orbit these coefficients may be chosen so that during the process of acceleration particle losses are a minimum. The theory of losses due to radiation fluctuations is given in Ref.4. Using the results obtained in the above papers, a brief discussion is given of methods of damping of the oscillations by varying the magnetic field along the orbit. Among the possibilities considered are resonance damping,

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SOV/120-59-1-2/50

The Damping of Particle Oscillations in an Electron Synchrotron with Strong Focussing

complex structures in the intervals between usual magnets (Ref.5), and reduction of the field in magnets with radial focussing. There are 1 figure and 5 references, of which 4 are Soviet and 1 is English.

ASSOCIATION: Fizicheskiy institut AN ArmSSR (Physical Institute, Academy of Sciences of the Armenian SSR)

SUBMITTED: November 21, 1957.

Card 2/2

SOV/120-59-1-3/50

AUTHORS: Orlov, Yu. F., Kheyfets, S. A.

TITLE: Distortion of the Magnetic Field by a Metallic Vacuum Chamber in a Strongly Focussing Accelerator (Iskazheniye magnitnogo polya metallicheskoy vakuumnoy kameroy v sil'nofokusiruyushchem uskoritele)

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 1, pp 21-23 (USSR)

ABSTRACT: The effect of the metallic vacuum chamber on the magnetic field and gradient in a strongly focussing accelerator is of major importance. Experimental work carried out in this direction (Ref.1) gives the right order of magnitude for these distortions but unfortunately, cannot give a correct picture of the field. Normally, the search coils used in such experimental work are so large that only measurements near the centre of the chamber are possible. Furthermore, such measurements depend on the particular magnet employed and therefore have only special value and do not apply in general. The present note derives expressions for the magnetic field inside a metallic vacuum chamber having an

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SOV/120-59-1-3/50

Distortion of the Magnetic Field by a Metallic Vacuum Chamber in a Strongly Focussing Accelerator

elliptical or a rectangular cross section. At high repetition frequencies eddy current heating of the chamber takes place and this effect is also briefly considered. There are 2 figures and 1 Soviet reference.

ASSOCIATION: Fizicheskiy institut AN ArmSSR (Physics Institute, Academy of Sciences, Armenian SSR)

SUBMITTED: November 1, 1957.

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24.4500

S/022/59/012/05/08/009

AUTHOR: Kheyfets, S.A.

TITLE: The Excitation of the Phase Oscillations of Particles in the Electronic Synchroton by Noises of the Magnetic Field, of the Frequency and of the Voltage of the Accelerating Field

PERIODICAL: Izvestiya Akademii nauk Armyanskoy SSR. Seriya fiziko-matematicheskikh nauk, 1959, Vol. 12, No. 5, pp. 105-113

TEXT: Starting from the equation for phase oscillations from (Ref. 1) the author calculates under several neglects the mean quadratic amplitude of the phase oscillations under consideration of the adiabatic and of the radiation damping for disturbances representable by the Fourier series $F(t) = \sum_k C_k e^{2\pi ifkt}$, and he obtains

(10) $$\overline{\varphi^2}\,\max = \frac{\pi}{2\dot{E}\,bd^2}\,A_B(\zeta),$$

where

(9) $\zeta = (b\,E)^4$, E full energy of the electron, d is defined by

Card 1/3

4

The Excitation of the Phase Oscillations S/022/59/012/05/08/009
of Particles in the Electronic Synchroton by Noises of the Magnetic Field,
of the Frequency and of the Voltage of the Accelerating Field

(11) $$\Omega = d\,\zeta^{-1/8}\,(1+\zeta)^{1/2} ,$$

where $\Omega$ is the frequency of oscillation, and

(12) $$A_\beta(\zeta) = \frac{e^{-(1+\beta)\zeta}}{\zeta^{1/8}(1+\zeta)^{1/2}} \int_{\zeta_0}^{\zeta} du\, \frac{\eta(u)\, e^{(1+\beta)u}}{u^{3/8}\,(1+u)^{1/2}}$$

where $\beta$ is a constant depending on the accelerator and $\eta = \dfrac{|C_k|^2}{2\pi f}$.

The variations of the amplitudes caused by noises of the accelerator are especially calculated.
The author thanks Yu.F. Orlov for discussion.

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S/022/59/012/06/07/009

AUTHOR: Kheyfets, S. A.

TITLE: Nonlinear Correction for the Frequency of the Phase Oscillations

PERIODICAL: Izvestiya Akademii nauk Armyanskoy SSR. Seriya fiziko-matematicheskikh nauk, 1959, Vol. 12, No. 6, pp. 121-122

TEXT: The author considers the equation

$$(1) \qquad \ddot{\varphi} + \Omega^2\varphi = \Omega^2\left(-\frac{1}{2}\varphi^2 \operatorname{ctg}\Phi_s + \frac{1}{6}\varphi^3\right).$$

He states that under consideration fo the second approximations the frequency of the solution (1) attains the form

$$(7) \qquad \Omega = \Omega_0\left(1 - \frac{5\operatorname{ctg}^2\Phi_s + 3}{48}A^2\right)$$

where A is the amplitude of the phase oscillations.
The author thanks Yu. F. Orlov for assistance.
There are 2 Soviet references.
ASSOCIATION: Fizicheskiy institut AN Armyanskoy SSR (Physical Institute AS Armenian SSR)
SUBMITTED: March 17, 1959 Card 1/1

KHEYFETS, S.A.

Method for creating stability of vertical motion in an accelerator with a magnetic field which increases with the radius. Dokl.AN Arm.SSR 29 no.5:211-213 '59.
(MIRA 13:6)

1. Fizicheskiy institut Akademii nauk Armyanskoy SSR.
Predstavleno akademikom AN Armyanskoy SSR A.I. Alikhanyanom.
(Particle accelerators)

24(5)

**AUTHOR:** Kheyfets, S. A. SOV/56-36-5-56/76

**TITLE:** On a Possibility of Determining the Sign of the Polarization of the $\mu$-Meson (Ob odnoy vozmozhnosti opredeleniya znaka polyarizatsii $\mu$-mezona)

**PERIODICAL:** Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 5, p 1588 (USSR)

**ABSTRACT:** A determination of the sign of muon polarization is a means of solving the law of the conservation of light particles; the author of the present "Letter to the Editor" therefore suggests a relatively easy method of determining the sign. Longitudinally polarized muons (from $\pi$ - $\mu$-decay) are investigated in a transversal magnetic field. Because of the anomalous magnetic moment on the meson, spin turns somewhat more rapidly than the momentum, so that after several rotations polarization is transversal. The sign of this polarization depends on the sign of the polarization of the meson before the latter enters the magnetic field. Estimation of the number of turns of the momentum which are necessary for the spin to turn round $\pi/2$ gives the following result: The turn of the spin with respect to the

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On a Possibility of Determining the Sign of the Polarization of the $\mu$-Meson SOV/56-36-5-56/76

momentum is $\psi' = 2\pi n(\varepsilon/m)\Delta\mu/\mu$ ; $\Delta\mu/\mu$ denotes the relative anomalous muon moment, $\varepsilon$ - its energy; in first approximation $\alpha/2\pi = 1.15 \cdot 10^{-3}$. For mesons with $\varepsilon/m \approx 1.7$, $n_{\pi/2} \approx 125$. The sign of transversal meson polarization may, e. g., be determined by measuring the asymmetry of the Coulomb scattering of the mesons (Refs 1, 2). The author evaluates the intensity of the scattered mesons and the degree of scattering asymmetry: Scattering occurred in the solid angle $\sim 1$, $Z = 80$, the kinetic meson energy = 80 Mev, the number of scatterings round $\pi/2$ per g/cm$^2$ matter: $\nu \approx 1.5 \cdot 10^{-5}$. At $H \approx 10^4$ oe the holdup of mesons in the system is $\approx 1.5 \cdot 10^{-6}$ sec, $\varepsilon/m \approx 1.7$, and if it is further assumed that $\approx 10^4$ mesons per second arrive on a layer of matter with 15 g/cm$^2$, $I \sim 1$ sec$^{-1}$ is obtained for the intensity of the mesons. The degree of asymmetry $a(\theta)$ is determined by means of

Card 2/3 $I(\theta)/I(-\theta) = (1+Pa)/(1-Pa)$. P denotes the degree of polarization of the primary meson bunch. With $\theta = \pi/2$, it holds that $a_{max} \approx 1/4$. The author finally thanks Yu. F. Orlov for discussions. There are 2 Soviet references.

ASSOCIATION: Fizicheskiy institut Akademii nauk Armyanskoy SSR (Physics Institute of the Academy of Sciences, Armyanskaya SSR)

SUBMITTED: January 16, 1959

S/120/60/000/006/002/045
E032/E514

24.4500 (1160, 1395, 1538)

**AUTHOR:** Kheyfets, S. A.

**TITLE:** Particle Losses and the Time of Existence of a Beam in a Beam Store. Quantum Fluctuations in the Emitted Radiation

**PERIODICAL:** Pribory i tekhnika eksperimenta, 1960, No.6, pp.14-17

**TEXT:** There are some grounds for assuming that at distances of the order of $10^{-4}$cm ordinary quantum electrodynamics does not hold. Apparently, the most direct method of studying the applicability of quantum electrodynamics at small distances is the use of high energy electron collisions. If the collisions take place between incident electrons and particles at rest (in the laboratory system), the necessary incident energy is extremely high (of the order of $10^{12}$ eV). In this connection a number of authors (Refs. 1 and 2) have suggested an experiment involving colliding beams. The electron beam in such an experiment should be stored in a magnetic system similar to that normally used in cyclic accelerators. In order to compensate for energy losses by radiation, it is necessary to have an accelerating electric field. This arrangement is defined by the present author as a "beam store". In view of the

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Particle Losses and the Time of Existence of a Beam in a Beam Store. Quantum Fluctuations in the Emitted Radiation

negligible particle density in the beam, the time of the experiment should be quite long. It follows that the parameters of the beam store should be chosen so that the time of existence of the beam should be not less than a given quantity. In order to be able to predict these parameters, one must have a knowledge of the particle losses in the beam store and their nature. The present author calculates the distribution function and the particle losses using the theory put forward by Orlov and Tarasov in Ref.3 for the phase and radial betatron oscillations in an accelerator. The calculations take into account radiation damping and variations in the magnetic field along the orbit. The results obtained refer both to phase and radial betatron oscillations. Numerical calculations are reported of the fraction of particles remaining in the beam as a function of time (Fig.2). There are 3 figures and 7 references: 5 Soviet and 2 English.

ASSOCIATION: Fizicheskiy institut AN ArmSSR (Physics Institute, AS ArmSSR)

SUBMITTED: August 7, 1959

Card 2/2

86729

S/120/60/000/006/003/045
E032/E514

24.4500 (1160, 1395, 1538)

**AUTHOR:** Kheyfets, S. A.

**TITLE:** The Time of Existence of a Beam in a Beam Store.
Scattering on the Residual Gas Atoms

**PERIODICAL:** Pribory i tekhnika eksperimenta, 1960, No.6, pp.18-19

**TEXT:** This is a continuation of the previous paper in this issue (pp.14-17). An estimate is obtained for the time of existence of a beam in a beam store assuming that the beam is attenuated as a result of elastic and inelastic scattering on the residual gas atoms. Both single and multiple scattering is taken into account. In the case of elastic scattering through small angles, the only important process leading to losses of electrons from the beam is the increase in the amplitude of betatron oscillations. In the case of inelastic scattering, the most important process is the emission of bremsstrahlung. It is shown that the time of existence of a beam with respect to single elastic scattering is given by an expression of the form

$$\tau_{el} = \frac{\varepsilon^2 \mathrm{tg}^2 \frac{\vartheta_{min}}{2}}{\pi Z^2 e^4 nc} \qquad (8)$$

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E032/E514

## The Time of Existence of a Beam in a Beam Store. Scattering on the Residual Gas Atoms

where $\varepsilon$ is the energy of an electron, $\vartheta_{min}$ is the minimum scattering angle leading to the loss of an electron and n is the density of the residual gas atoms having an atomic number Z. In the case of the inelastic scattering, it is shown that multiple scattering has practically no effect on particle losses, whilst single scattering leads to the following expression for the time of existence of the beam

$$\tau_{\text{торм}} = \frac{3 \times 137}{16Z^2 r_o^2 nc \ln\left(\varepsilon/\Delta \varepsilon_{max}\right)} \qquad (15)$$

When the pressure is $10^{-6}$ mm, $\tau_T \simeq 10^3$ sec. Acknowledgment is expressed to Yu. F. Orlov for advice and discussions. There are 3 Soviet references.

ASSOCIATION: Fizicheskiy institut AN ArmSSR
(Physics Institute AS ArmSSR)

SUBMITTED: October 6, 1959

Card 2/2

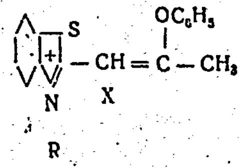
S/019/60/000/021/018/145
A152/A029

AUTHORS: Sveshnikov, N.N.; Kheyfets, S.A.

TITLE: A Method of Obtaining Quarternary Salts of 2-β-Phenoxypropenylbenzithiazole

PERIODICAL: Byulleten' izobreteniy, 1960, No. 21, p. 17

TEXT: Class 12p, 4. No. 133061 (651382/23 of January 21, 1960). This is a method of obtaining quarternary salts of the above-named substance with the following structure:



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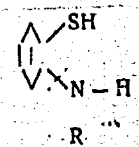
where "R" is a hydrocarbon radical, "X" is an anion. This method has the following special feature: the N-alkyl- or N-arylorthoaminothiophenols of the structure: are made to interact with a haloidanhydride (e.g., with the perchloric anhydride of the β-phenoxycrotonic acid) in a solution of aromatic hydrocarbons (e.g., benzene), at room temperature.



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S/019/60/000/013/157/200/XX
A152/A027

AUTHORS: Kheyfets, S.A., and Sveshnikov, N.N.

TITLE: A Method of Obtaining Thia,-seleno- and thiaselenocarbocyanine Dyes With a Substitute at the Middle Carbon Atom of a Polymethine Chain

PERIODICAL: Byulleten' izobreteniy, 1960, Nr. 13, p. 44

TEXT: Class 22e, $7_{02}$. Nr. 129771 (641080/23 of Oct 13, 1959). Dependent on Author' Certificate Nr. 93374. 1. In order to obtain dyes with a cycloalkyl concentration at the middle atom of polymethine chain, one uses for the initial products the quaternary salts of $\beta$-alkoxy-$\beta$-cycloalkylvinyl derivatives of benzthiazole or benzselenozole or their substitutes in the aromatic ring, and condenses them with the quaternary salts of 2-methyl derivatives of a benzthiazole or benzselenozole series in the medium of aliphatic spirits, in the presence of triethylamine, at an increased temperature. 2. The same method where the reaction is carried out at room temperature, during several hours.

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S/019/60/000/04/141/315
D038/D006

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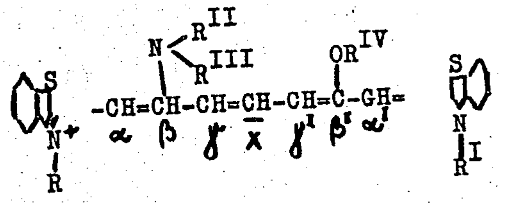
AUTHORS: Kheyfets, S. A., Sveshnikov, N. N. and Kurepina, G. F.

TITLE: A Method of Obtaining Thia-Tricarbo-Cyanine Dyes

PERIODICAL: Byulleten' izobreteniy, 1960, Nr 4, p 31 (USSR)

ABSTRACT: Class 22e, $7_{02}$. Nr 126206 (627307/23 of 5 May 1959). The distinguishing feature of the method is that thia-tricarbocyanines of the alkoxy- and amino group are transferred at the same time into the beta, beta'-state, and dyes are obtained of the general formula I



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A Method of Obtaining Thia-Tricarbo-Cyanine Dyes

where R, $R^I$ and $R^{IV}$ are same or different alkyl groups, $R^{II}$ and $R^{III}$ the hydrogen atom, alkyl or aralkyl, $R^{II}$ and $R^{III}$ together are the residue forming a 5- or 6-membered cycle, $\bar{X}$ the acid residue,

β,β' the di-alkoxy-thia-tricarbo-cyanines of the structure II

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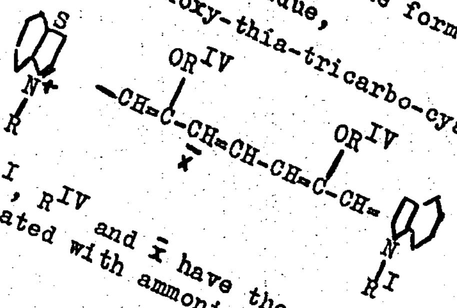

where R, $R^I$, $R^{IV}$ and $\bar{X}$ have the above indicated significance and are treated with ammonia, primary or secondary aliphat

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A Method of Obtaining Thia-Tricarbo-Cyanine Dyes

aliphatic-aromatic or heterocyclic amines in an aliphatic alcohol medium or pyridine at usual temperature or short heating up to 100° C.

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Kheyfets, S. A.

SOV-19-58-4-236/525

**AUTHORS:** Sveshnikov, N.N., Kheyfets, S.A., Stotovskaya, N.S.

**TITLE:** A Method for Obtaining Symmetrical and Unsymmetrical Tricarbocyanine Dyes (Sposob polucheniya simmetrichnykh i nesimmetrichnykh trikarbotsianinovykh krasiteley)

**PERIODICAL:** Byulleten' izobreteniy, 1958, Nr 4, p 61 (USSR)

**ABSTRACT:** Class 22e, 7102. Nr 109457 (570290, 5 April 1957). Submitted to the Committee for Inventions and Discoveries at the USSR Council of Ministers. The method for obtaining symmetrical and unsymmetrical tricarbocyanine dyes is explained by three structural formulas.

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S/022/60/013/01/10/010
C 111/ C 333

AUTHORS: Orlov, Yu. F., Kheyfets, S. A.

TITLE: Depolarization of the Bundle Under Motion in an Inhomogeneous Magnetic Field

PERIODICAL: Izvestiya Akademii nauk Armyanskoy SSR. Seriya fiziko-matematicheskikh nauk, 1960, Vol. 13, No. 1, pp. 169-171

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TEXT: For the measurement of the magnetic moment of an electron ? one can use the variation of polarization of the particle which occurs under rotation of the particle in a magnetic field. If the field is inhomogeneous, then a depolarization of the bundle takes place. If the magnetic field is given by

$$(3) \qquad H = H_0\left(1 - n\frac{r}{\varrho} + m\frac{r^2}{\varrho^2} + \dots\right),$$

where n and m describe the values of the gradient and of the second derivative of the field, then for the period of the particle it holds

$$(4) \qquad T = T_0\left(1 + \frac{2m - n - n^2}{2(1-n)} \cdot \frac{\bar{r}^2 - \bar{z}^2}{\varrho^2}\right).$$

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